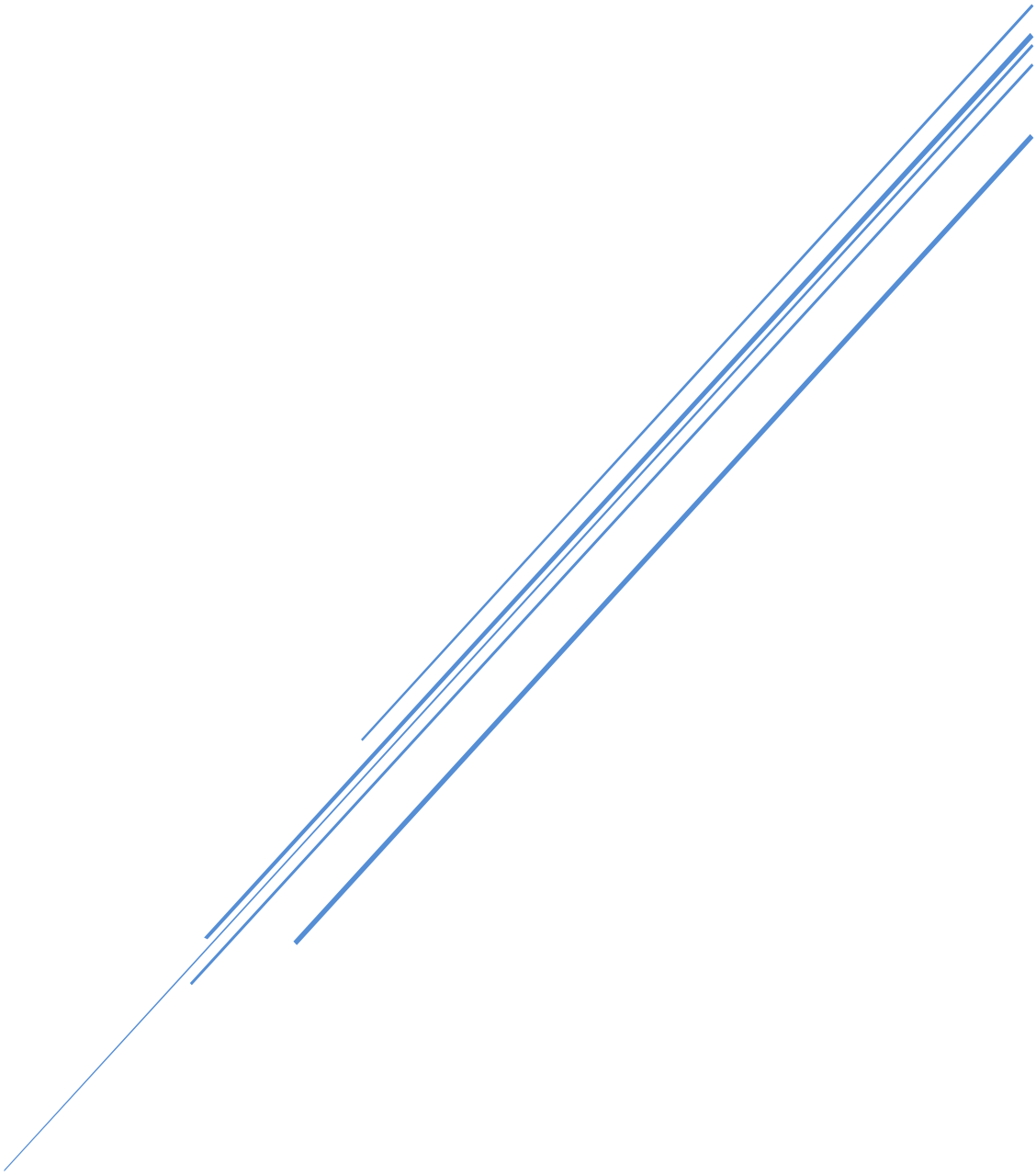
RESUME

Hamid Dahaghin



Surface Engineering Processes and Applications

Personal Information

Hamid Dahaghin

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Education

1997-2002, **Bachelor of Science** (B.Sc.) in Materials Engineering, Department of Materials Engineering, Isfahan University of Technology (IUT), 84156-83111, Isfahan, Iran.

Thesis title: "Influence of operational factors on the properties of physical vapor deposited silver coatings", Thesis supervisor: Prof. Fakhreddin Ashrafizadeh.

Professional Experiences

1. 2012-2019 (Continued)**,** ***Turbo Tech Company,*** Technology department, coating division;

- Head of coating division since 2017 and responsible for many coating tasks since 2012
- SGT600, Repair project, Technology development of several coatings & Relevant tasks;
  - *A conventional TBC by APS process for combustion chamber*
  - *An Overaluminized MCrAlY coating for 1st and 2^{ed} stage vanes (HVOF and Pack C.)*
  - *A multilayer TBC on 1st vanes (all gas paths or platforms by HVOF & APS processes)*
  - *Writing and revising process specification and delivery terms for all developed coatings*
  - *Coating the parts according to their relevant process specification and work procedure*
  - *Evaluation and verification applied coatings in accordance with their delivery terms*
  - *Data gathering from the used coatings after level-B or Level-C (during incoming steps)*
- IGT25, Manufacturing, Technology development of various coatings & Relevant tasks;
  - *A multilayer ceramic coating by PVD process for compressor blades*
  - *A conventional TBC by APS process for combustion chamber*

- *An Overaluminized MCrAlY coating by HVOF and slurry processes for 1st and 2ed stage turbine blades & vanes*
- *An Abrasive coating on tip of 1st and 2ed stage turbine blades*
- *A multilayer TBC for 1st turbine blades*
- *Writing and revising processes specification and delivery terms for all developed coatings*
- *Coating the parts according to their relevant process specifications and work procedures*
- *Evaluation and verification applied coatings in accordance with their delivery terms*
- *Data gathering from applied coatings after the scheduled time*

- IGT25, Brazing, Technology development for vacuum brazing of compressor segments;
  - *Optimizing brazing parameters (gap size, amount of filler, temperature, time, fixturing, ...)*
  - *Writing and verifying Brazing Process Specification (BPS)*
  - *Vacuum brazing of compressor vanes, rings and honeycombs*
  - *Evaluation of applied brazing via VT, FPI, microstructure, tensile or shear strength, ...*

- IGT25, Brazing, Supervising vacuum brazing of honeycomb to turbine parts;
  - *Writing and verifying Brazing Process Specification (BPS) for each part*
  - *Supervising vacuum brazing of honeycombs to rings, shroud segments and vane segments*
  - *Evaluation of applied brazing via VT, FPI, microstructure, tensile or shear strength, ...*

- GE F9, Technology developments of various coating as followings;
  - *Several hardface coatings for contact areas of combustion chamber (Extendor)*
  - *Three new classes of TBC for liner of combustion chamber*
  - *A Modern TBC for 1st stage vanes & A specific TBC for 1st stage blades*
  - *A state of the art lifetime improvement for honeycombs of turbine section*
  - *Several classes of abradable coatings for 1st stage shroud segments*
  - *A specific coating for clearance management in cold and hot section*

- IGT25, Upgrading, Technology development for following coatings (in progress);
  - *Two new PVD coatings for compressor blades*
  - *A specific coating for compressor vanes*
  - *Two new classes of TBC for combustion chamber*
  - *Two new slurry coatings for Turbine blades and vanes*
  - *A new MCrAlY coatings for turbine blades and vanes*
  - *A CVD aluminide coating for overaluminizing*
  - *A new coating for internal passages of 1st and 2ed stage blades*
  - *Two new TBC for turbine blades and vanes*

- IGT25 & SGT600, Part supply, Supervising and verifying coated parts as following;
    - *Preparing and delivering all required processes specifications and delivery terms to suppliers for coatings compressor blades, compressor casing, compressor rings, combustion chamber and turbine blades and vanes.*
    - *Coatings inspection according to their relevant delivery terms (often NDT)*

- Other Experiences relevant to Coating, Brazing and Heat treatment;
    - *Writing many process specifications and delivery terms (in English or Farsi)*
    - *Writing many technical reports and work procedures (in English or Farsi)*
    - *Answering many TSR and NCR relevant to coating and brazing*
    - *Preparing several Gantt chart, OPC, and Technical reports*
    - *Direct technical support in the coating shops*
    - *Performing final inspection for coatings and brazing*
    - *Auditing and verification of new coating suppliers*
    - *Preparing roadmap and managing to do it*
    - *Technology development of SSA12 coating for compressor blades*
    - *Technology development of an aluminide coating for cooling passages of turbine blades*
    - *Applying a hardface coating by laser cladding*
    - *General knowledge about the coatings of some gas turbines such as SGT100, SGT200, SGT400, SGT700 & SGT800, GEF5, GEF6, GEF9, Zorya DU80, V94-2, ...*

2. 2006-2012**, *Manager & Operator of APS Shop,*** Materials and Energy Research Center (MERC), Ministry of Science, Research and Technology, Karaj:

- Troubleshooting & starting up a plasma spray system (Sulzer Metco - 3MB)
- Foundation APS coating shop in the MERC
- Operator of APS system for 6 years
- Performing maintenance and repair of APS system
- Ordering & purchasing of various powder materials, masking materials, spare parts, ...
- Applying different coatings by the APS system such as Yttria Stabilized Zirconia (YSZ), Ceria Stabilized Zirconia (CSZ), Al_2O_3, Cr_2O_3, MCrAlY, TiO_2, Ni-based, Mo-based, ...
- Coating characterization via adhesion strength, hardness, microstructure, bending, thermal shock, ...evaluation and writing COC for verified coatings

3. 2006-2011***, Turbine industries,*** part time cooperation and consultant in several companies, Tehran:
    - Responsible for coating of different sorts of various gas turbine components:
        - *Writing manufacturing processes to coat some parts*
        - *Ordering required materials*
        - *Supervising on coating processes (Pack cementation, APS, HVOF, Plasma nitriding, ...)*
        - *Performing delivery tests & Final inspection*
    - Advisor of M. Sc. Thesis; Evaluation of The Influence of Plasma Nitriding Parameters on The Dimensional Growth, Amirkabir University of Technology.
    - Responsible for vacuum brazing of compressor segments of a gas turbine;
        - *Writing manufacturing processes*
        - *Ordering required filler materials*
        - *Supervising on brazing process*
        - *Performing delivery tests & Final inspections*
    - Cooperation on manufacturing of some gas turbine components in view point of Metallurgical evaluation, Heat treatment cycle and coating process
    - Supervising following projects:
        - *Technology development of Platinum modified aluminide coating (Pt-Al) for turbine blades*
        - *Technology development of applying TBC on a combustion chamber*
        - *Technology development of MCrAlY coating for some turbine components by VPS*
        - *Feasibility study of applying thermal barrier coatings on hot components by electron beam physical vapor deposition (EB-PVD)*
    - Start up and Troubleshooting of an induction vacuum brazing furnace based on its catalogue, brazing general knowledge and previous vacuum experiments

4. 2006-2007***, Niro Research Institute (NRI***), at the end of shahid Dadman Blv., shahrak ghods, Tehran:
    - Cooperation in manufacturing of GE F5 combustion chamber via reverse engineering:
        - *Material identification*
        - *Welding evaluation for defining used filler and processes*
        - *Defining manufacturing processes (Forming, Welding, Machining, heat treatment, ...)*
        - *Preparing delivery inspections*

5. 2001-2005***, Iran Surface Research and Engineering Center (ISREC),*** Manager of coating shop & Head of PVD group Isfahan Science and Technology Town (ISTT), Isfahan, Iran:

- Start up, troubleshooting, operation and overhaul of following coating systems;
    - *Semi-industrial plasma nitriding furnace*
    - *Experimental & Semi-industrial PVD systems (Evaporation, Ion plating & EBPVD*
    - *Vacuum systems (Rotary, roots and diffusion pumps, vacuum gauges, sealing, leakage, ...)*

- Managing research projects (Executive manger):
    - *Development of ion vapor deposition (IVD) of Al as an alternative to pollutant cadmium electroplating*
    - *Formation and evaluation of physical vapor deposited Cr coatings and its comparison with hard chromium coating.*
    - *Formation and evaluation of physical vapor deposited Pb-In as a solid lubricant coating*

- Plasma Nitriding different kinds of experimental samples and industrial components such as precision gears according to their relevant specification.

Abilities and Proficiencies

- English proficiency;
    - *Fluent in technical reading*
    - *Good at general English speaking and writing*

- Good at Presenting and Persuading people in technical meetings

- Good at Writing proposal, technical reports, processes specification, delivery terms, ...

Holding Workshop & technical Seminar

- Physical Vapor deposition processes, theory & applications, Workshop presented at the 6th National Surface Engineering Seminar, Kerman, Iran.

- Plasma Nitriding, theory & applications, Workshop presented at the 7th National Surface Engineering Seminar, Kerman, Iran.

- Surface engineering in the aero-engine industry, Seminar presented at Iran Aircraft Industries Co.

Scientific Publications (as co-author, all in Farsi)

- 1. PVD low friction coatings for aerospace applications,1thInternational Conference of Manufacturing and Production Engineering,2005, Iran.
- 2. Formation and evaluation of PVD coatings on cast iron specimens, 9th Annual Congress of Iran Metallurgical Engineers Association,2005, Iran.
- 3. The influence of plasma on the lubrication mechanism of PVD lead coatings, 9th Annual Congress of Iran Metallurgical Engineers Association,2005, Iran.
- 4. The effect of process parameters on the PVD-Al coating characteristics, 9th Annual Congress of Iran Metallurgical Engineers Association,2005, Iran.
- 5. The effect of plasma spray process parameters on the properties of ceramic coatings, 7th Iran Ceramic Congress, 2009, Shiraz, Iran.
- 6. Evaluation of microstructure, hardness and adhesion strength of applied an abradable MCrAlY-BN/polyester coating on a component of gas turbine by APS process, 19th national Seminar on surface engineering, 2019, Isfahan, Iran.
- 7. Microstructure, hardness and adhesion strength evaluation of applied a Chromium carbide cermet coating on some parts of combustion chamber of by HVOF process, 19th national Seminar on surface engineering, 2019, Isfahan, Iran.
- 8. Application and characterization of FSX 414 coating on a combustion chamber by HVOF process, 19th national Seminar on surface engineering, 2019, Isfahan, Iran.

Subjects of Interest

- Incoming inspection and recoat the used part
- Writing process specification and delivery terms for coating
- Getting feedback from the coated parts at Time Between Overhaul (TBO)
- Application and characterization modern and smart coatings of gas turbines
- Involve with PVD type coating processes such as Arc-PVD, EB-PVD, PSPVD, ...
- Connecting to well-known coating company
- Connecting to expert coating consultant
- Replacing conventional gas turbine coatings with modern coatings
- Life assessment of coatings
- Design of coatings for gas turbine parts

Updated at: May 17, 2019